


# Gabriel Eichler, PhD.



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Data & Analytics Workstream  
Kraft Precision Medicine Accelerator

A stylized line drawing of an oak tree with a thick trunk, spreading branches, and a root system.

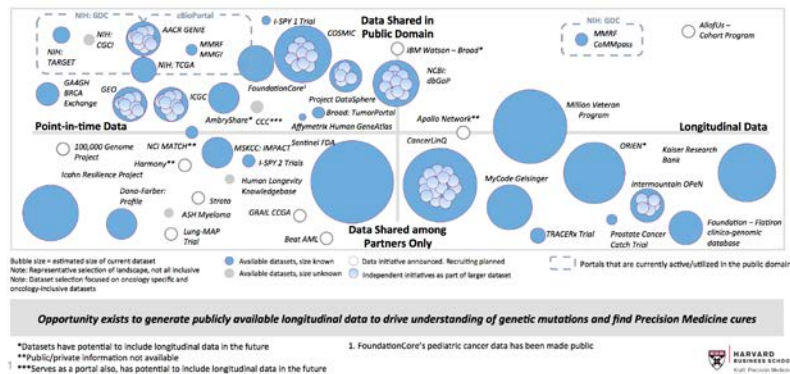
Founder and Managing Director  
Oak Health Partners, LLC

# A recipe for insights

**Question** + **Data Source** + **Analytical Method**

# Update to the KPMA Real World Data Landscape

## 2016 Data Landscape



**Focus:** Longitudinally, Openness, Funding Sources

**Scope:** Datasets of all sizes and types

**Since 2016:**

- Lots of new entrance are generating and consuming real world oncology data
- New data assets are becoming available commercially
- New registries and platform trials have burgeoned
- Massive investments in clinical data abstraction technologies and efforts

## 2018 Data Landscape

**Focus:** Integration of Molecular, Clinical, Longitudinally and Accessibility

**Scope:** Most significant datasets by size and disease focus; Dataset linkage and abstracted clinical data. US Focused.

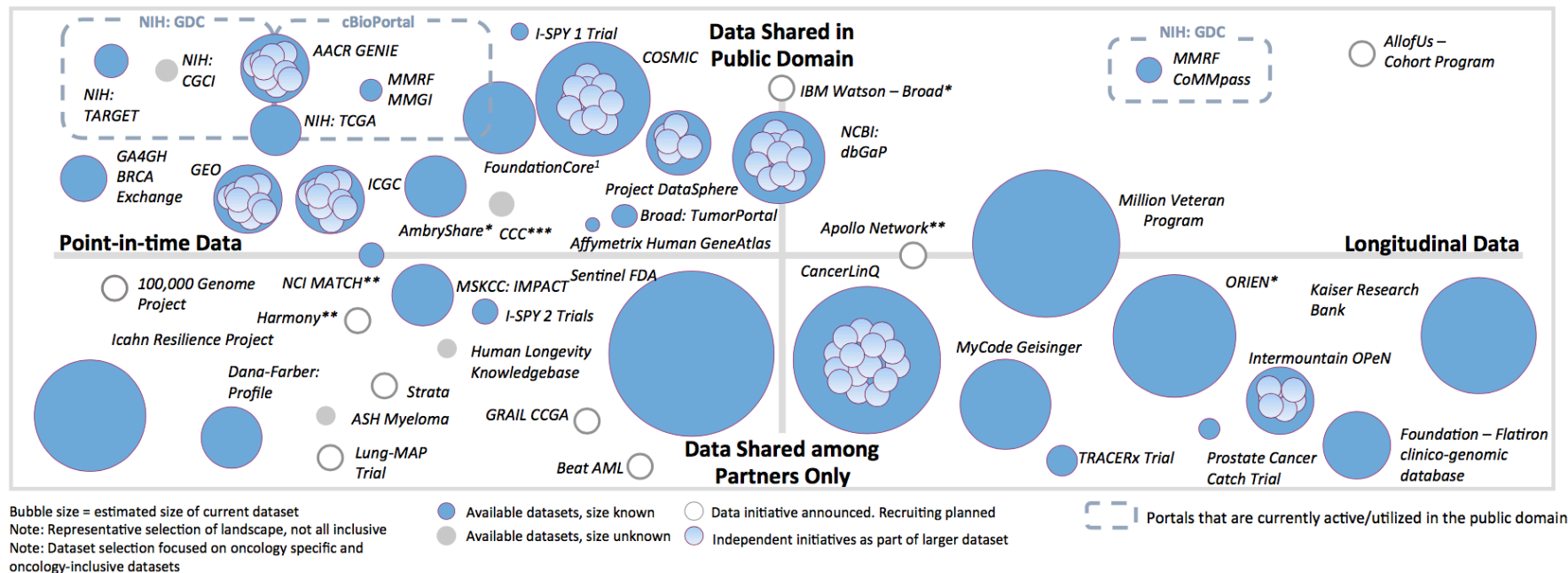
Collected Meta-data in Q4 2017 - February 2018

**Data Collection:**

- Stakeholders Included for-profit and non-profit dataset owners
- Initially survey outreach with telephone follow-up as needed



# 2016 Data Landscape



**Opportunity exists to generate publicly available longitudinal data to drive understanding of genetic mutations and find Precision Medicine cures**

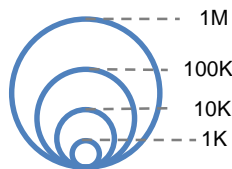
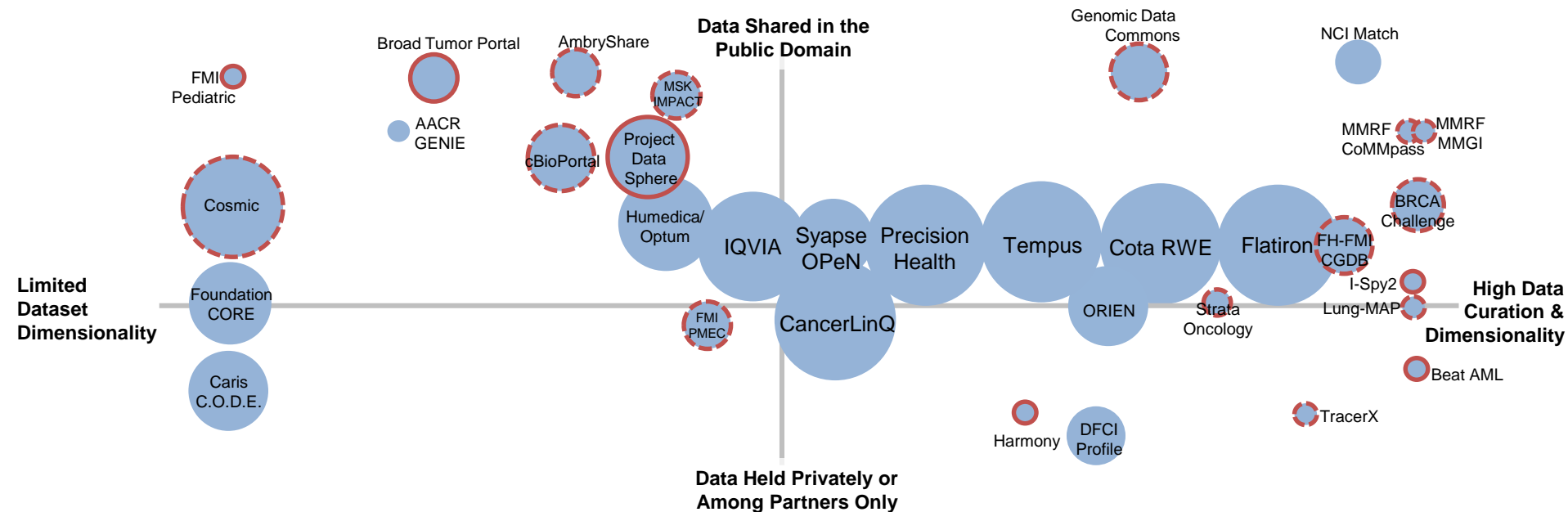
\*Datasets have potential to include longitudinal data in the future



\*\*Public/private information not available

1. FoundationCore's pediatric cancer data has been made public

1 \*\*\*Serves as a portal also, has potential to include longitudinal data in the future

# 2018 Data Landscape



 No Support of Linkage  
 Willing to Consider Linkage  
 No border Does or Will Link Data

Large, integrated data assets are starting to emerge and advance real world data research – but platform trials and registries continue to have highly tuned data for particular diseases.

X-Axis: Dataset Quality refers to the integration of (a) molecular, (b) disease-specific, structured clinical, (C ) longitudinal data  
Y-Axis: Higher up organizations are sharing openly and for free. Mid-axis organizations have commercial offerings and closed, private data are inaccessible to anyone

Genomic Data Commons contains data from FoundationCORE, Broad's CCLE program, NCI's CCGI, TARGET and TCGA programs.

# KEY FINDING ON 2018 DATA LANDSCAPE

## Real World Assets Are Growing in Size and Sophistication:

- 25% growth in median size since 2016.
- Many organizations now exceed 1M patients in their dataset.
- Heavy investments in data abstraction.
- Patient registries have rich data tailored to specific diseases

## Sharing and Linking Models are Winning:

Growing value of linked data assets:

- Flatiron + Foundation Medicine
- CancerLinQ + PH.AI + Tempus
- OPeN
- M2Gen / ORIEN
- HealthVerity (not shown on landscape)

## Willingness to Share and Link Are Rising:

The largest data assets have embraced a willingness to link:

- Cota, Caris, DFCI Profile, and many others
- Many organizations indicate a willingness to share though consent and technical hurdles are prohibitive.

## The Frontiers of RWD Are Advancing:

Advancing the frontier lies in

- Linked specimen banks
- Raw imaging datasets for radiomics
- Patient re-contact rights & mechanisms to enable additional research opportunities

# Questions for Discussion

1. What's your impression on the state of Real World Data?
2. Do you think that the field has progressed?
3. What's it going to look like 24 months from now?
4. What are the frontiers that will add the most value to data consumers?

# Real World Data Analytics Landscapes



# Healthcare Analytics Explosion

**Swiss pharma company Roche is buying Flatiron Health for \$1.9 billion** / Feb 15, 2018 **TE**

**Philips launches AI platform for healthcare**  
Published: March 1, 2018 *The New York Times*

**Big Data, Analytics Ready to Meet Health Care Challenges**  
MAY 01, 2018 **HEALTHCARE**  
Analytics News

**AI Holds Promise of Improving Doctors' Diagnoses**  
With artificial intelligence, machines can see what many humans may have missed  
Sept. 12, 2017 **WSJ**



# Healthcare Analytics Uncertainty, Confusion and Concern

**Amazon's Alexa Really Isn't Ready For Healthcare**

MAY 24, 2018 HEALTHCARE  
Analytics News

**AI Healthcare Revolution: Doctors and Data  
Fight Chronic Challenges**

May 24, 2018



**Artificial Intelligence In Healthcare: Separating  
Reality From Hype**

MAR 13, 2018 **Forbes**

**IBM pitched its Watson supercomputer as a revolution  
in cancer care. It's nowhere close**

SEPTEMBER 5, 2017 **STAT**

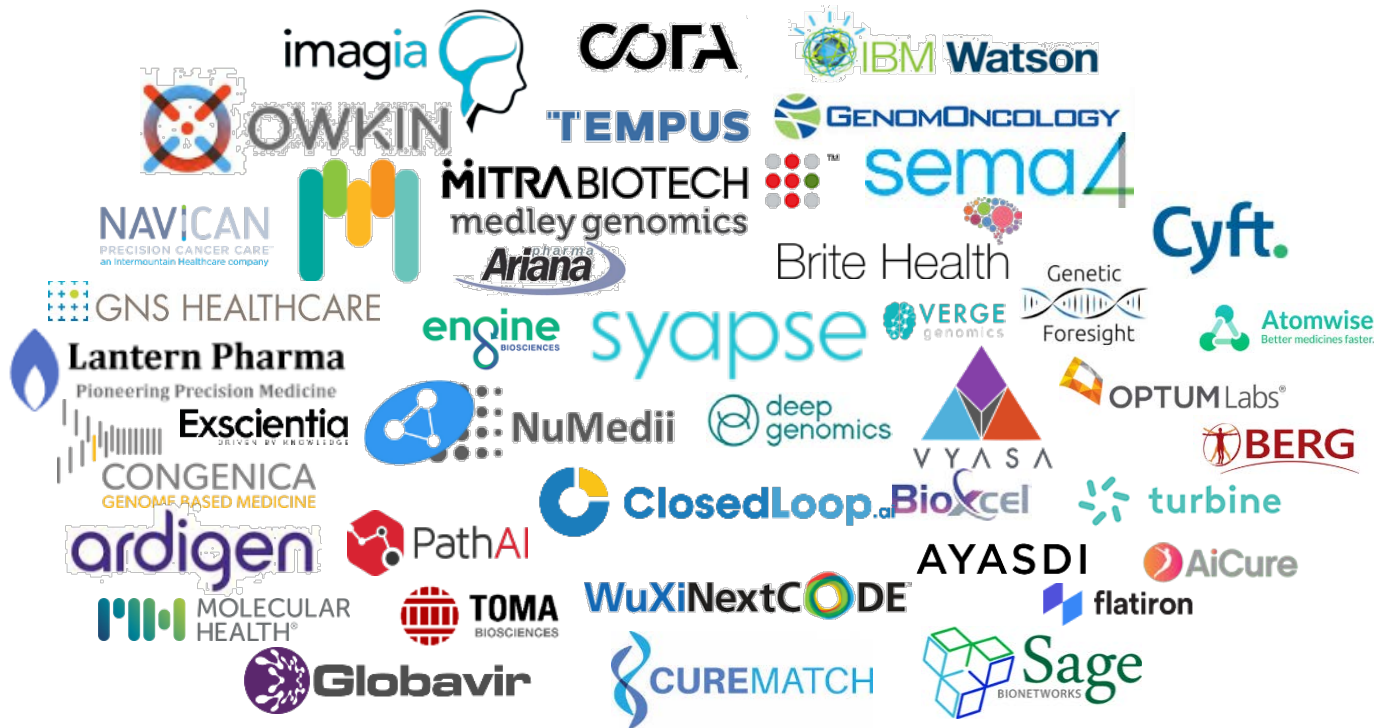


Oak Health Partners



**HARVARD  
BUSINESS SCHOOL**  
Kraft Precision Medicine  
Accelerator

# Market is Complex and Lacks Direction on Emerging and Established Players



# Key Stakeholders and Questions for Analytics Landscape

## Stakeholders:

- Investors
- Researchers
- Non-Profits
- Hospitals/Care Centers
- Payers
- Patients



## Questions:

- Who should I partner with?
- Who should I invest in?
- What sort of tech should I build or buy?
- What tech is most mature and may be used in treating patients in the near term?

# Our Approach:

## Companies analyzed:

- 48 Companies identified through online reports, conference agendas, etc.
- Primarily US-based

AICure	Clinithink	GNS Healthcare	Owkin	Tempus
Ardigen	ClosedLoop.ai	Imagia	PathAI	TOMA Biosciences
Ariana Biopharma	Congenica	Lantern Pharma	Precision Health.ai	Turbine.ai
Arterys	COTA	Medley Genomics	Recursion Pharma	twoXAR
Atomwise	Deep Genomics	Mendel.ai	Resonant Therapeutics	Verge Genomics
Ayasdi	Deep6	Mitra Biotech	Sage Bionetworks	Vyasa
BenevolentAI	Engine Biosciences	Molecular Health	Sema4	WuXi NextCode
BERG Analytics	FDNA	Navican	SHYFT Analytics	Zebra Medical Vision
BioXcel	Genetic Foresight	NuMedii	Standigm	
Cellworks	GenomOncology	Numerate	Syapse	

# Our Approach:

## Companies excluded:

- 17 Companies identified initially but removed during data collection phase
- Excluded because either AI was too small a focus within the larger business, or insufficient data was found

### Too Complex

Flatiron Health

IBM Watson

IQVIA

Luxoft

Optum Labs

Palantir

### Insufficient Data

Brite Health

Mozi.ai/

Curematch

nQ Medical

Cyft

Quantitative Medicine

Data4Cure

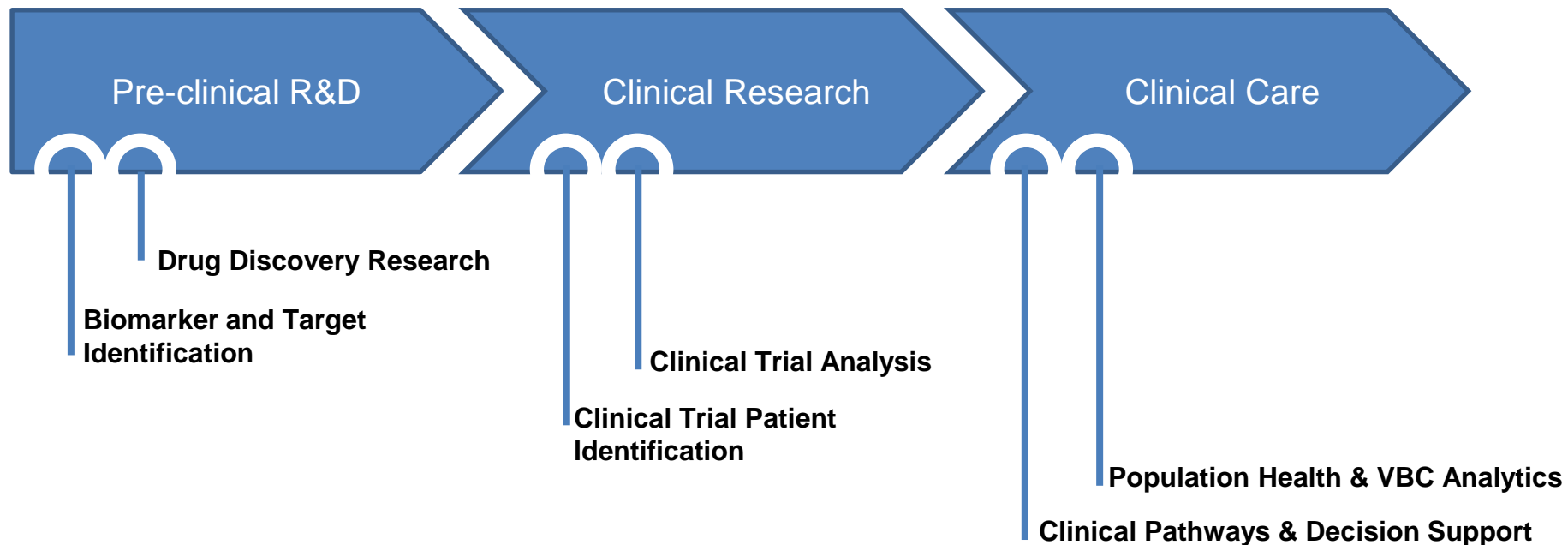
Trials.AI

E-therapeutics

Exscientia

Globavir

# Our Approach:



# Our Scoring Methodology

## Acceleration

April 2017- April 2018:

- Financing
- % job growth
- % open positions



## Establishment

Total Number of Announced:

- Publications/case studies
- Partnerships/customers
- Financing



**Establishment  
Percentile**

Industry Standards	Hot Companies
Uncertain Potential	Emerging Companies

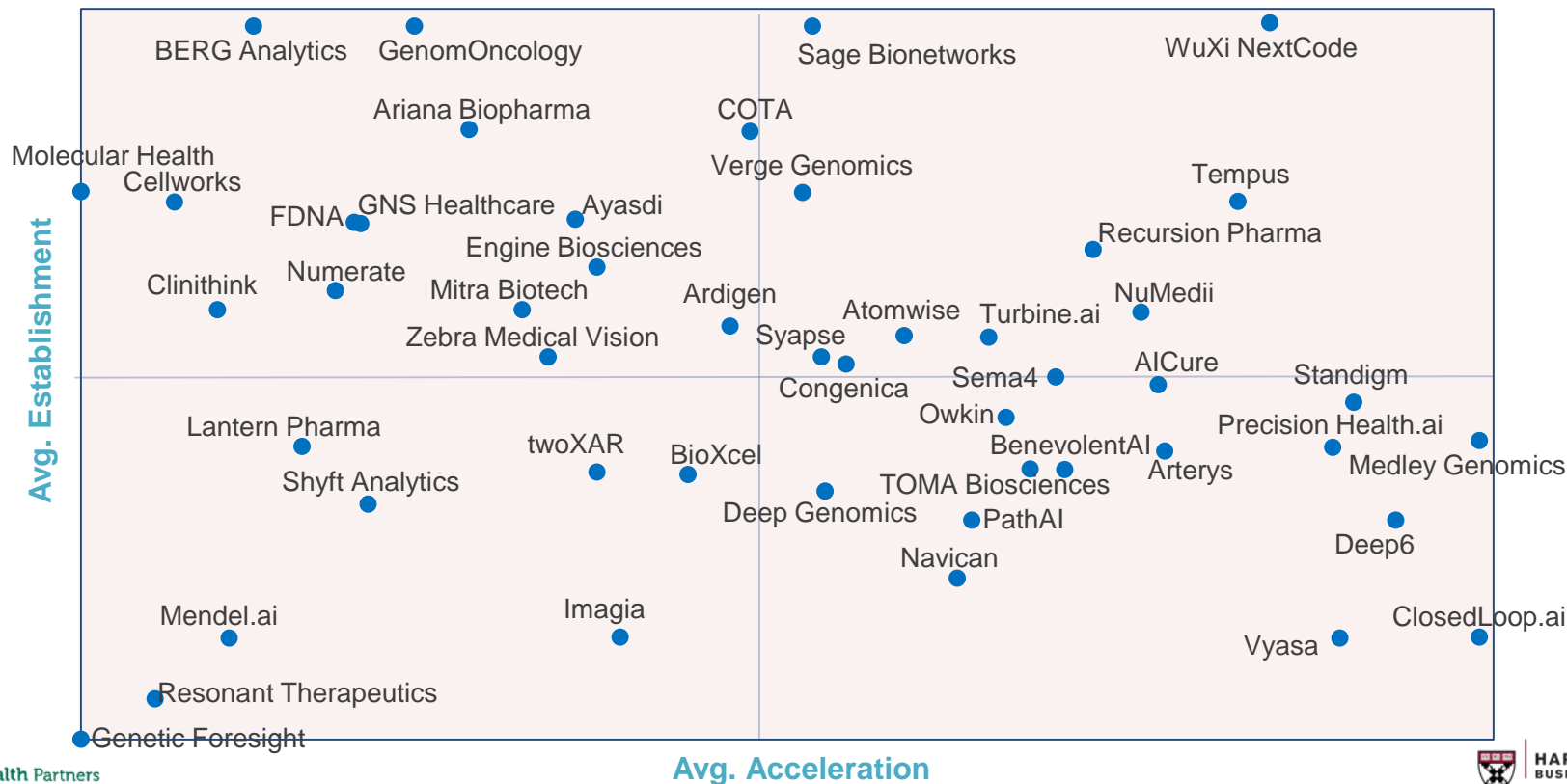
**Acceleration  
Percentile**



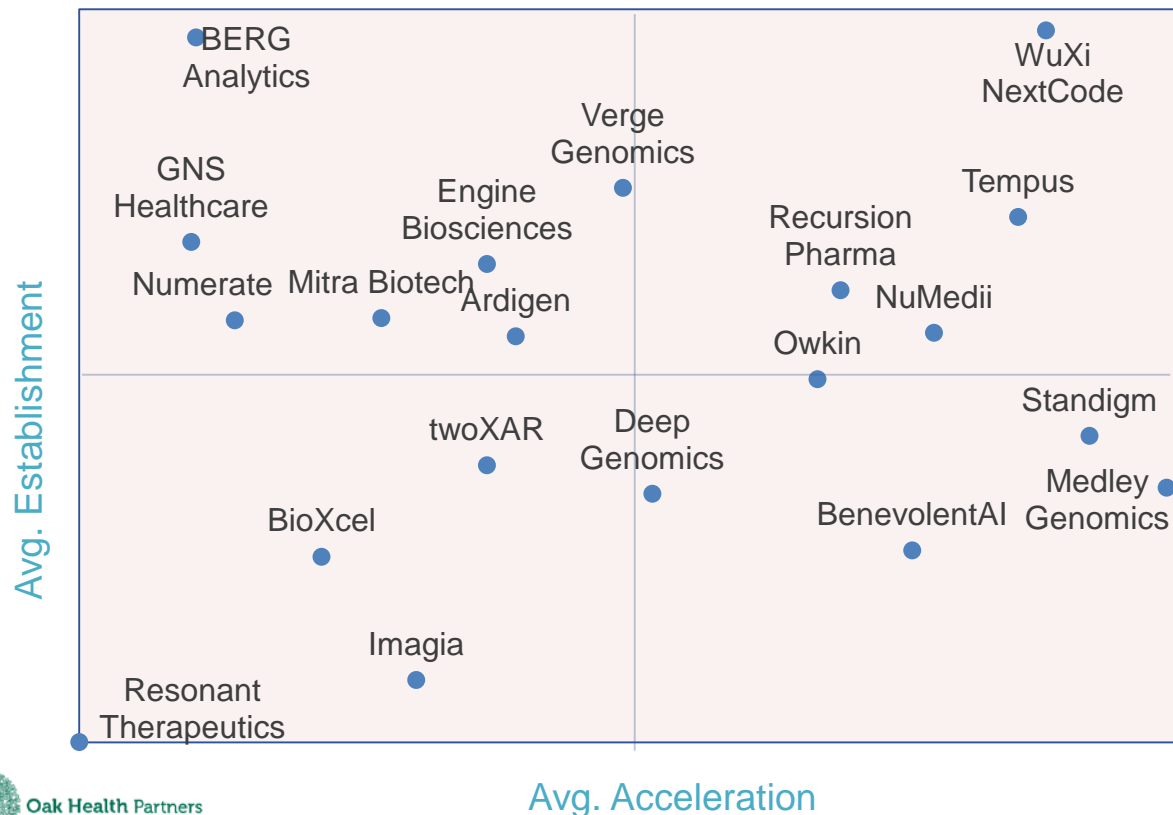
# Some Notes and Limitations

- US Focused
- Limited accuracy with small or large, complex organizations
- Quantifies organizations at the level of the company, not the specific capabilities.
- Trailing indicator with significant time sensitivity
- May fail to capture breakthrough innovators pursuing new use cases or opportunities.

## All Companies Included in Analysis



# Biomarker and Target ID Companies



## Highlighted Co's

### Wuxi NextCode

*"A contract Genomics Organization"*

- \$240M raised in Sept 2017
- Fast Company's Top 10 Most Innovative Companies 2018

### Tempus

*"Data-Driven Precision Medicine"*

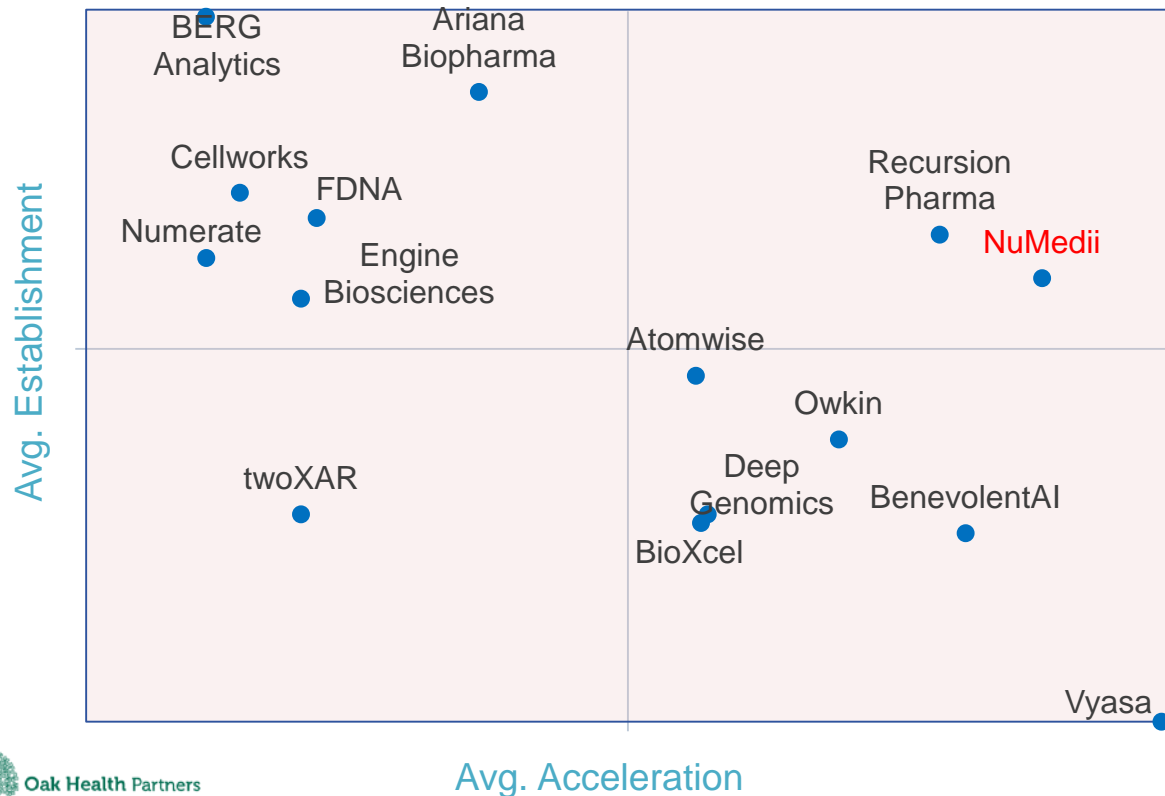
- \$80M Series B in March 2018
- Unicorn
- Licensed ASCO's CancerLinQ dataset
- 40+ Partnerships announced

### Recursion Pharma

*"We're aiming for 100 new treatments by 2025"*

- \$60M funding in Oct 2017
- Partnership w/ Sanofi

# Drug Discovery Companies



## Highlighted Co's

### NuMedii

*"Pioneering the use of big data, AI and Systems biology in Drug Discovery."*

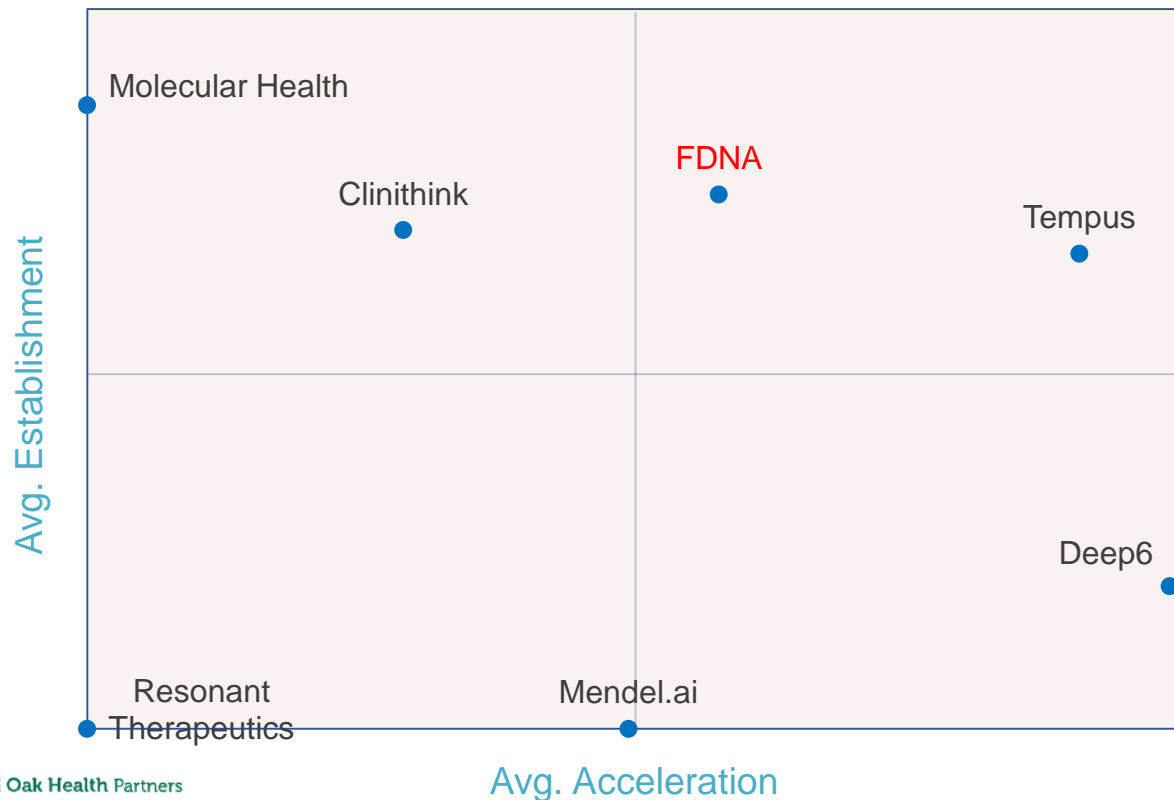
- Partnerships w/ Allergan, Astellas, Boehringer Ingelheim, Aptalis, Three Lakes, Treehouse
- 14 publications

### Recursion Pharma

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# Clinical Trial Patient ID Companies



## Highlighted Co's

### FDNA

*"Genomic insights through next-generation phenotyping"*

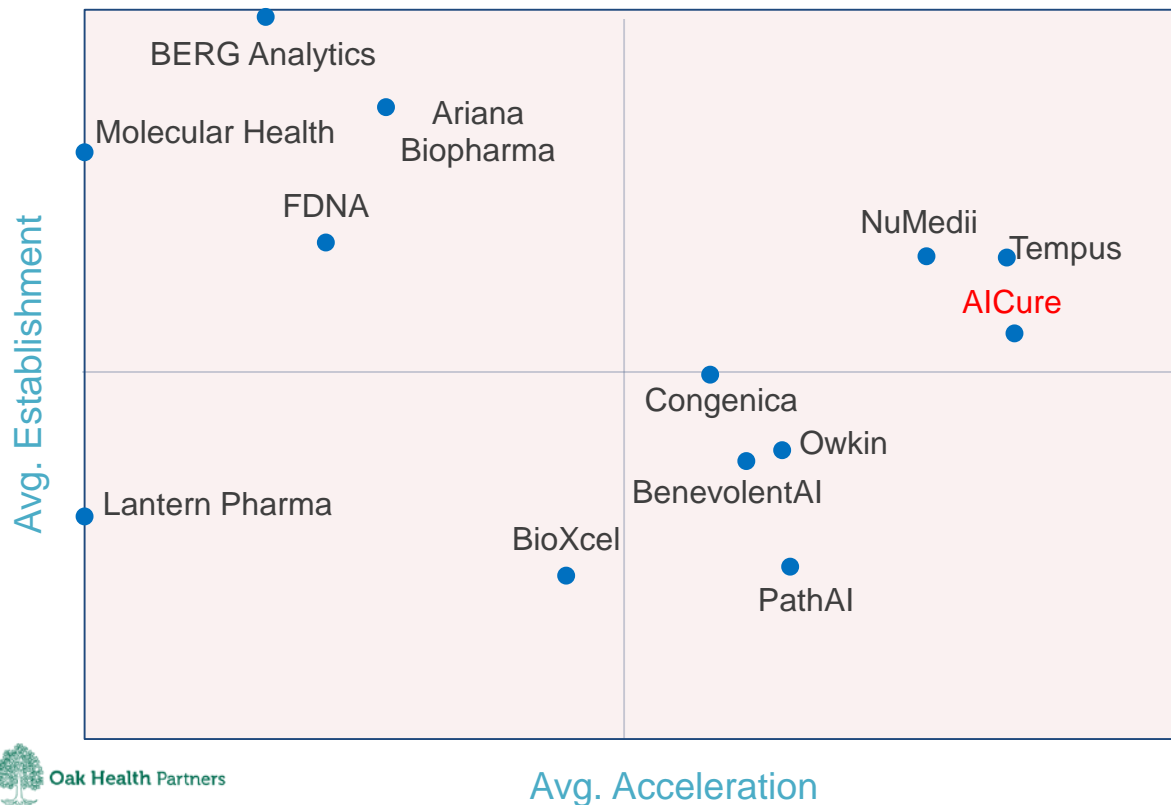
- 24% growth in headcount in 12 months.
- Partnerships in rare disease research at Vanderbilt Medical Center and the University of Hong Kong

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# Clinical Trial Analysis Companies



## Highlighted Co's

### AlCure

*"AlCure is bringing continuity of care to patients throughout the world"*

- 50% headcount Growth in 1 yr.
- Nearly 100 patents
- \$27M in total funding
- Partnerships with WHO, Roche, Takeda, AbbVie

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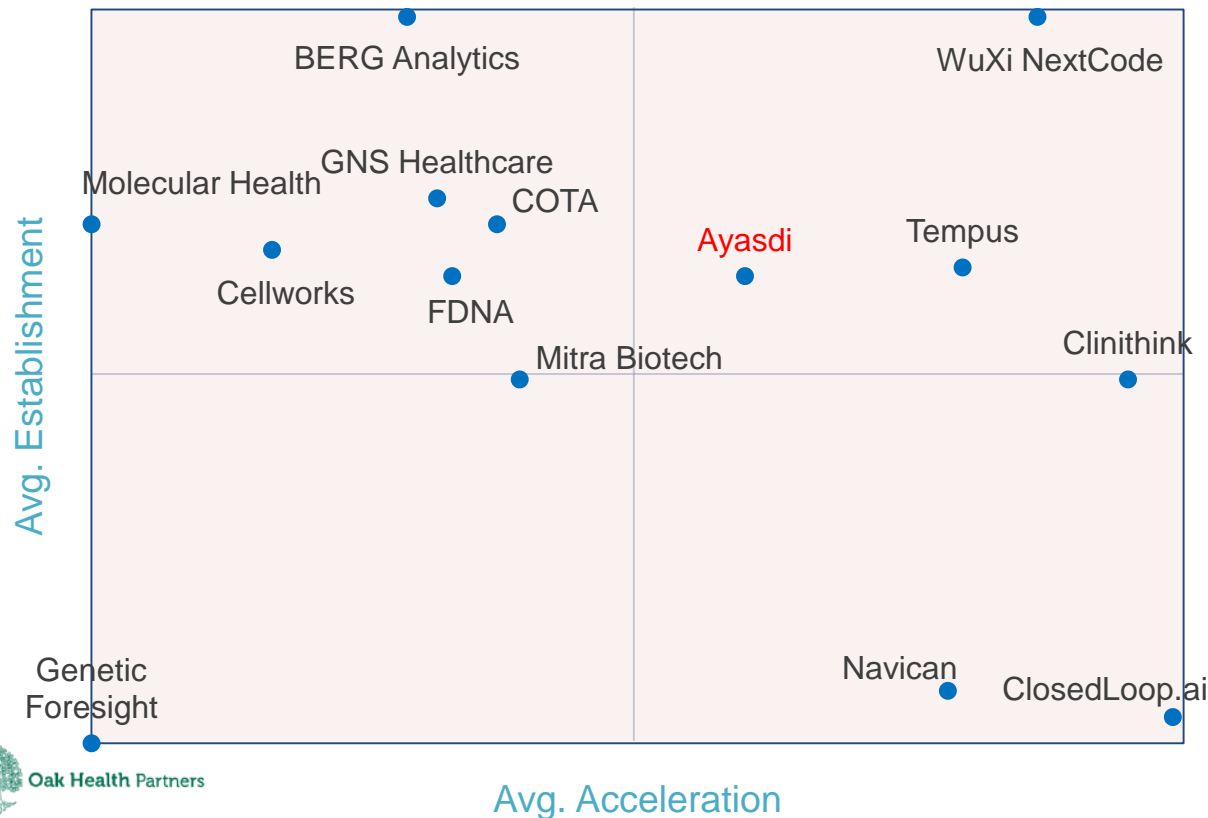
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# Clinical Pathways & Decision Support Companies



## Highlighted Co's

### Ayasdi

*"Rocket fuel for the journey to value based care"*

- Partner with Stanford, Mt. Sinai, UCSF, UCSD, Columbia, LBNL, Karolinska, Harvard Med,
- Kleiner Perkins is an investor

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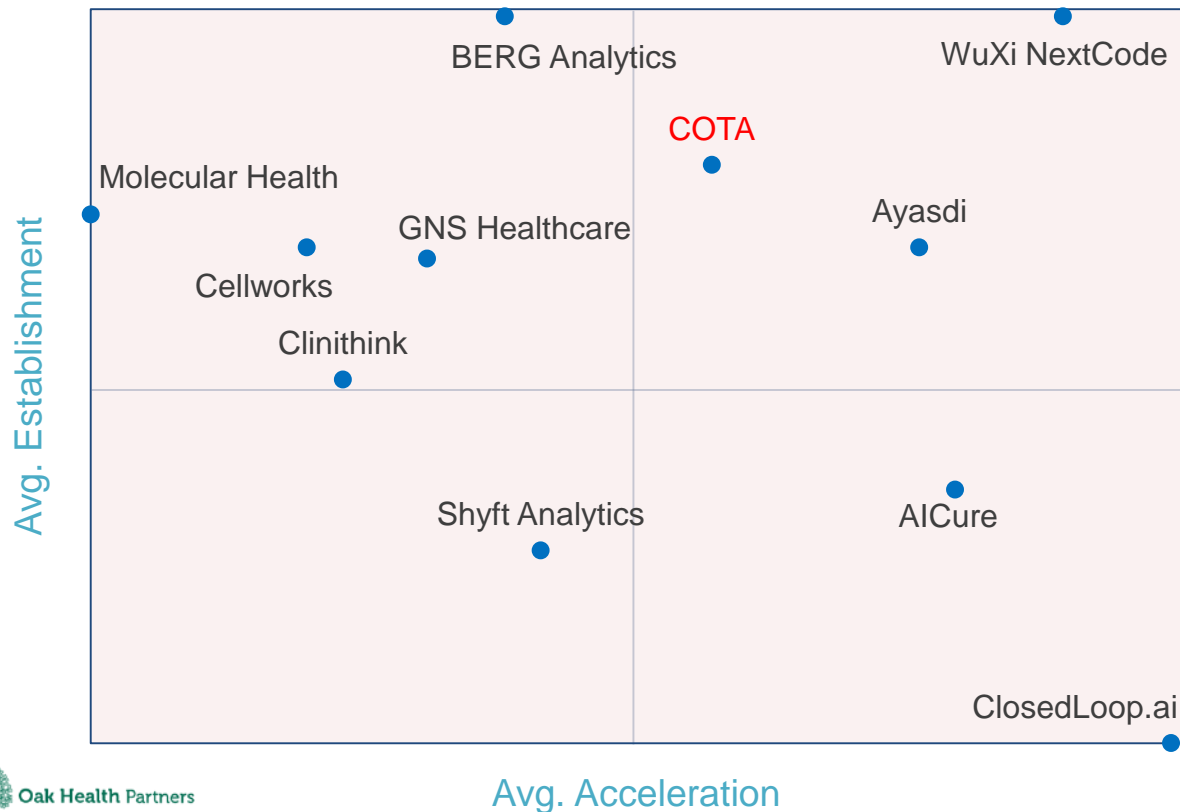
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- Fast Company's Top 10 Most Innovative Companies 2018

### Tempus

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- Unicorn
- Licensed ASCO's CancerLinQ dataset
- 40+ Partnerships announced

# Population Health and Value-based Care Analytics



## Highlighted Co's

### COTA

*"Improving the lives of cancer patients everywhere with data and technology"*

- Just raised \$40 (with \$65M in total funding)
- Works closely with Memorial Sloan Kettering and many others.

### Wuxi NextCode

*"A contract Genomics Organization"*

- \$240M raised in Sept 2017
- Fast Company's Top 10 Most Innovative Companies 2018

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# Questions for Discussion

1. General reactions?
2. How do you see companies competing in this space?
3. How will analytics evolve over the next 24 months?
4. Why might we be seeing a limited number of major 'exits' by these companies?
5. What opportunities are there to improve what the services delivered by these companies?

# A Special Thanks

## Data Landscape:

- Daniel Evans
- Laura Fontana, Ph.D.

## Analytics Landscape:

- Ryan Karmouta, MD, MBA
- Michael Milligan, MD, MBA
- Garrett Buxton, MBA

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